

# **The influence of second language learning on speech production by Greek/English bilinguals**

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## **Abstract**

This study examined 20 Greek/English bilinguals, living in the Vancouver area, Canada. The duration of aspiration for the three voiceless stops (/p/, /t/, /k/) and for the following vowel for a series of Greek and English stimuli were analyzed. Factors such as the Age of Arrival (AOA), Age of Learning (AOL), Length of Residence (LOR), everyday use of Greek and English and self-estimated proficiency in both languages were taken into consideration. A number of English sentences produced by the same speakers were also collected and rated for accentedness by native speakers of English. The degree of accent of the bilingual subjects were also examined along with the data collected. The main focus of the study is to see how the interaction of first language (L1) and second language (L2), if any, is observed concerning VOT (voice onset time) and following vowel duration.

## **Introduction**

The focus on this study is the comparison of Greek and English VOT (Voice Onset Time) for voiceless stops consonants /p/, /t/, /k/ produced by Greek/English bilinguals. VOT was examined in the initial stressed syllable of disyllabic Greek and English words. Thus, the factors of stress and syllable ordering were controlled. The interaction between the L1 and L2 phonological systems was also explored. Factors correlating with VOT production were also taken into consideration such as the AOA (Age of Arrival), AOL (Age of Learning), LOR (Length of Residence), Education level, everyday use of Greek and English and self-estimated proficiency in both languages. The participants also read a number of sentences that were judged for accentedness by a group of native English speakers.

The expected results are that L1 affects L2 and the other way round, thus VOT in both L1 and L2 are expected to deviate from the average performance of monolinguals. Also, it is expected the accent-ratings to correlate with the degree of shift in the production of VOT. The stronger the accent that a subject has, the least affected is expected to be the Greek VOT by English/L2 and its English VOT is expected to be more affected by Greek/L2.

## **Theoretical background**

This study follows Flege's Speech Learning Model (SLM), (Flege, 1987, 1992, 1995), as well as Best's (1993) Perceptual Assimilation Model (PAM).

## **Methodology**

The participants in this study were 20 Greek/English bilinguals living at the time in the Greater Vancouver area, BC, Canada. Greek was their first language (L1) and English was their second language (L2). There were 11 male and 9 female subjects, mean age=58, (range=39-78) who had been living in an English speaking environment for at least 16 years (range=16-50, mean=35).

The recordings were made in the quietest room in the participants' house or working place by the same Greek speaking researcher using a tape recorder; the data were later digitized at 44KH and 16bits. The procedures were conducted mostly in the Greek language, except when the participant him/herself shifted to English. The participants first signed a consent form and then completed a language background questionnaire, where information such as their profession and age, AOA, AOL, LOR, Education level, self-estimated proficiency in both languages and self-estimated everyday use of Greek were collected.

Then, the participants wearing a head-mounted microphone read a list of 20 Greek and 20 English disyllabic words. Each list was read three times. The English stimuli were read in the carrier phrase 'I say\_\_again', while the Greek carrier phrase was "Ipa\_\_pali". Therefore, the data collected were [20X15X3] =900 instances of VOT and vowels for Greek and English respectively. At the end of the session, the participants read three English sentences<sup>1</sup> three times so the data collected were [20X3X3]=180 sentences.

In the accentedness experiment four native speakers of English rated the sentences for accentedness using a 9-point scale ranging from 1= no accent to 9= extremely strong accent (mean age=40, range 26-59). The researcher scanned the sentences for overall quality selecting three from each subject, so the stimuli presented were 20X3=60. The stimuli were randomized for each of the three times that each judge listened to them.

## **Results - discussion**

As shown in studies of Italian/English (MacKay & al, 2001), French/English (Flege, 1987, 1991), English/Portuguese (Major, 1992), Greek/English bilinguals (Efstathopoulou, 2006), it is expected that the bilingual subjects will produce intermediate VOT values for English VOT, because of L1 influence, but also Greek VOT values longer than those of monolinguals because

of L2 influence. The influence is expected to be similar for vowel length. However, the VOT-to-vowel ratio will be examined. Since values for Greek VOT (Fourakis, 1986) and vowels (Hawks & Fourakis, 1995), are shorter in comparison with the English ones (Klaa, 1975, Lisker & Abramson, 1967).

Also, the accent rating of the subjects will be taken into account along with the VOT and vowel measurements. The four native speakers/judges gave accent rating for the 20 bilingual subjects, as shown in the following table along with the subjects' age, age of arrival, length of residence, estimated percentage of use of Greek.

Table 1. Accent ratings.

SJ#	Age	AOA	AOL	LOR	% of Use	Overall Mean
G1	65	27	20	38	40	7.28
G2	62	20	20	42	20	4.33
G3	71	25	17	46	90	6.67
G4	39	23	16	16	60	6.94
G5	39	21	4	18	40	1.58
G6	42	25	10	17	15	3.22
G7	57	24	12	33	50	5.78
G9	55	27	28	28	80	2.22
G10	68	18	18	50	60	6.47
G11	57	19	14	38	60	7.19
G12	62	23	23	39	40	5.33
G13	60	27	15	33	0.5	7.00
G14	55	22	14	33	50	5.42
G15	64	19	19	45	60	5.58
G16	65	27	27	38	95	7.64
G17	57	19	19	38	95	8.22
G18	52	17	14	35	30	4.67
G19	61	32	16	29	80	5.78
G20	54	15	13	39	70	5.69
G21	78	29	20	49	10	7.33

## Notes

1. The sentences, a subset from Munro & Derwing (1995) were: a) The Queen of England lives in London, b) Some people love to eat chocolate, c) Ships travel on the water.

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